MORPHOLOGY, SYSTEMATICS AND ECOLOGY OF NEW MONOGONONT ROTIFERA (ROTATORIA) FROM THE ALLIGATOR RIVERS REGION, NORTHERN TERRITORY

by W. KOSTE* & R. J. SHIEL†

Summary

KOSTE, W. & SHIEL, R. J. (1983) Morphology, systematics and ecology of new monogonont Rotifera (Rotatoria) from the Alligator Rivers region, Northern Territory. *Trans. R. Soc. S. Aust.* **107**(2), 109-121, 31 May, 1983.

Seventy-six rotifer taxa were recorded from eight billabongs of the Magela creek, a tributary of the East Alligator River, at the end of a six month dry season. Three new taxa are described and figured; *Brachionus falcatus* Zacharias f. *reductus* n.f., *B. urceolaris sericus* n.f. and *Macrochaetus danneeli* n.sp., with two new records for the continent. The species assemblage is compared to that of the same biotopes in the wet season, in which 174 taxa, including four new species and 25 new records, were identified. Differences in rotifer species assemblages are related to biotope heterogeneity; shallow floodplain billabongs are extreme biotopes with low species diversity, whereas deeper perennial channel billabongs are refuges for a diverse assemblage of periphytic taxa and resting eggs of monogonont and encysted eggs of bdelloid rotifers of ephemeral waters of the area.

KEY WORDS: New Rotifera, billabongs, extreme biotopes, northern Australia.

Introduction

The Magela Creek, approximately 260 km east of Darwin (Fig. 1), is an ephemeral tributary of the East Alligator River. It rises on the northern escarpment of the Arnhem Land sandstone plateau and flows northward to join the East Alligator some 90 km from its mouth into Van Diemen Gulf. On its course it passes two uranium ore deposits, Ranger and Jabiluka.

Intensive limnological monitoring prior to commencement of mining operations included studies of billabongs along the Magela Creek downstream of these deposits (e.g. Tait 1979[1], Walker & Tyler 1979[2], Bishop 1980, Hart & McGregor 1980, Ling & Tyler 1980[3], Bishop et al. 1981[4], Tait 1981, Marchant 1982, Burgman & Tait in press).

In the six month period when most of the Magela Creek floodplain and the channel of the Creek (with the exception of deeper billabongs) dries out, aquatic life is crowded into a few perennial waters. These concentrations of organisms are accompanied by stresses on the system produced by accumulation of organic matter resulting from decomposition. Both vary the water quality so much that individual billabongs can be considered extreme biotopes. The potential exists for further stresses to be placed on these habitats by the development of uranium mining and milling, and associated industrial and domestic wastes entering the Magela Creek system.

A preliminary report on the microcrustacean zooplankton of one of these naturally stressed systems was given by Tait (1981). The only information on the Rotifera (Aschelminthes: Rotatoria) of the Northern Territory are brief notes (Shiel & Koste 1979, Koste & Shiel 1980b) and a more comprehensive paper by Koste (1981). The last publication involved a sample series collected from billabongs of the Magela Creek by R. D. Tait at the end of the wet season (April 1980). This paper gives the results of further studies of samples from the same biotopes collected by Tait at the end of the dry season (Nov.-Dec. 1980), when an

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[1] Tait, R. D. (1979) Distribution and chemical composition of aquatic macrophytes of the Magela Creek floodplain, Northern Territory. Report presented to Aust. Soc. Limnol. Annual Conference, Tallangatta.

[2] Walker, T. D. & Tyler, P. A. (1979) *A limnological survey of the Magela system, Alligator Rivers region, Northern Territory.* Interim report to the Office of the Supervising Scientist, Sydney.

[3] Ling, H. U. & Tyler, P. A. (1980) *Freshwater algae of the Alligator Rivers region, Northern Territory of Australia.* Report to the Office of the Supervising Scientist, Sydney.

[4] Bishop, K. A., Allan, S. A., Pollard, D. A. & Cook, M. G. (1981). *Ecological studies on freshwater fish of the Alligator Rivers region, Northern Territory.* Report to the Office of the Supervising Scientist, Sydney.

impoverished rotifer species assemblage was expected. More detailed seasonal data, including systematics and ecology of the microcrustacean plankton, will be published elsewhere (Tait, Shiel & Koste in press.).

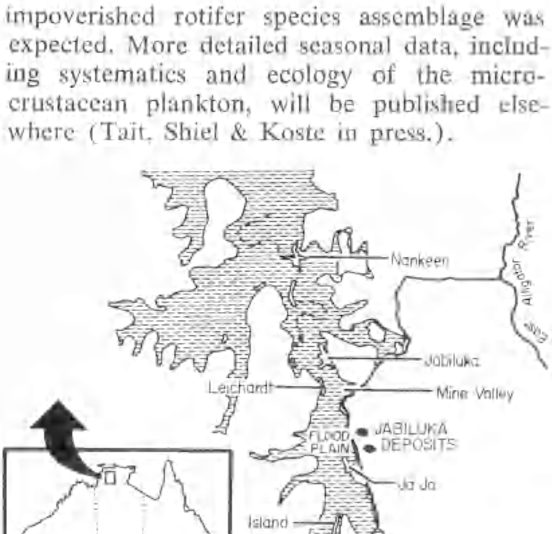

Fig. 1. The Magela Creek floodplain showing billabongs sampled.

Species recorded from each habitat are listed, and seasonal differences in the species assemblages related to environmental fluctuations. Three previously unknown rotifera taxa are described.

Methods and materials

Thirteen plankton samples (25 ml filtrate) were collected from eight billabongs (Table 1) by net tow on 10.11 and 8.12.1980 by R. D. Tait (then of Pancontinental Mining Ltd) and preserved in formalin. Collections were taken from the same billabong series as described by Koste (1981) and included all three types distinguished by Hart & McGregor (1980), i.e. backflow (Winmurra), channel (Buffalo and Island) and floodplain (Ja Ja, Jabiluka, Nankeen, Leichhardt and Mine Valley). Comparative physio-chemical features are tabulated by Koste (1981).

Several samples contained large numbers of microcrustacea. These were removed with a 300 μm bronze mesh. Microcrustacean assemblages of the billabongs are considered by Tait et al. (in press). Rotifera recorded are listed systematically (following Koste 1978). Several illoricate rotifers, mostly bdelloids, were strongly contracted in response to the preservative, and could not be identified (shown as "indet." in Table 2. For the treatment of samples and individuals, also preparation of trophi, see Koste 1978: 42–43 and Koste 1981: 101.

Rotifera new to Australia

Previously unknown rotifers were recorded from Winmurra billabong (*Brachionus falcatus* Zacharias n.f.) Mine Valley billabong (*B. urceolaris sericus* (Rousselet) n.f.) and Buffalo billabong (*Macrochaetus danneeli* n.sp.), described below. Three species, (*Beauchampiella eudactylota* (Gosse), *Eosphora* cf. *thoides* Wulfert and *Octotrocha speciosa* Thorpe were recorded for the first time from

TABLE 1: *Comparative physico-chemical features at the time of plankton sampling in 8 billabongs of the Magela Creek, at the beginning of the wet season.*

Sample No. and date	Billabong	pH	Conductivity μS cm^{-2}	Water temp. °C	Dissolved O_2 ppm	cf. April 1980
10.11.80						
1a 80111001	Nankeen	4.47	281	29.1	3.75	pH 5.47
2a 80111002	Jabiluka	4.77	181	31.3	4.15	pH 5.26
3a 80111003	Mine Valley	3.45	931	29.6	5.90	pH 5.37
4a 80111004	Ja Ja	4.24	172	35.0	3.29	pH 5.44
5a 80111005	Island	4.93	51	32.0	5.55	
7a 80111007	Buffalo	5.38	29	30.9	4.15	
8a 80111008	Leichhardt	5.74	218	30.4	4.30	
08.12.80						
1b 80120801	Nankeen	4.45	283	29.1	4.63	
2b 80120802	Jabiluka	4.14	199	31.3	5.04	28 μS
3b 80120803	Mine Valley	3.25	1233	29.3	7.30	27 μS
4b 80120804	Ja Ja	4.08	215	32.6	5.67	25 μS
6b 80120806	Winmurra	5.76	103	29.9	3.72	
7b 80120807	Buffalo	5.30	30	31.4	4.48	

TABLE 2. *Rotifera from Magela Creek samples, with comments on presence and biogeography.* cosm. — cosmopolitan; ptr. — pantropical; end. = endemic; 1 = first record from the continent; per. = perennial; n. = not recorded in April sample series. Sample numbers are as in Table 1. (Abundance: — = not recorded; r = individual specimens or rare; f = frequent, more than 5% of recorded rotifers; m = more than 20% of rotifers recorded.)

Taxon		Sample number													
		1a	1b	2a	2b	3a	3b	4a	4b	5a	6b	7a	7b	8a	8b
Superorder Bdelloida															
1. *Dissotrocha aculeata* (Ehrb. 1832)	cosm.; n.	—	—	—	—	—	—	—	—	f	—	—	—	—	—
2. *D. macrostyla* (Ehrb. 1838)	cosm.; n.	—	—	—	—	—	—	—	—	r	—	r	r	—	—
3. *Bdelloida* (indet.) (Genera: *Philodina, Rotaria, Macrotrachela, Habrotrocha*)															
Superorder Monogononta															
Order Ploimidae															
Family Epiphanidae															
4. *Epiphanes clavulata* (Ehrb. 1832)	ptr.; per.	—	—	—	—	—	—	—	—	—	f	—	—	—	m
Family Brachionidae															
5. *Platyias quadricornis* (Ehrb 1832)	cosm.; per.	—	—	—	—	—	—	—	—	—	—	—	r	—	—
6. *Brachionus angularis* Gosse 1851															
7. *B. bidentata testudinarius* (Jakubski 1912)															
8. *B. budapestinensis* (Daday 1885)	cosm.; n.	—	—	—	—	—	—	—	f	—	m	r	f	—	—
9. *B. dichotomus dichotomus* Shephard 1911	end.; per.	—	—	—	—	—	—	—	—	f	—	—	—	—	—
10. *B. dichotomus reductus* Koste & Shiel 1980	end.; per.	—	—	—	—	—	—	—	—	—	—	—	r	—	—
11. *B. falcatus falcatus* Zacharias 1898	cosm.; per.	—	—	r	—	r	—	r	r	f	—	f	m	—	—
12. *B. falcatus* Zach. f. *reductus* n.f.	end. 1; n.	—	—	—	—	—	—	—	—	—	f	—	—	—	—
13. *B. lyratus Shephard* 1911	end.; n.	—	—	—	—	—	—	—	—	—	—	—	r	—	—
14. *B. quadridentatus melheni* (Barrois & Daday 1894)	ptr.; per.	—	—	—	—	—	—	—	—	r	—	—	r	—	—
15. *B. urceolaris sericus* (Rousselet 1907) n.f.	end.?; n.	—	—	—	—	m	m	—	—	—	—	—	—	—	—
16. *Beauchampiella eudactylota* (Gosse 1886)	cosm. 1; n.	—	—	—	—	—	—	—	—	—	—	—	r	—	—
17. *Anuraeopsis coelata coelata* (Beauchamp 1932)	ptr.; per.	—	—	—	—	—	—	r	m	m	—	f	f	—	—
18. *A navicula* Rousselet 1910	ptr.; per.	—	—	—	—	—	—	f	—	r	m	r	r	—	—
19. *Keratella tropica tropica* (Apstein 1907)	ptr.; per.	r	r	f	—	r	—	m	f	m	—	r	r	—	—
Fam. Collurellidae															
20. *Colurella obtusa* (Gosse 1886)	cosm.; per.	—	—	—	—	—	—	—	—	—	—	—	r	—	—
21. *Lepadella latusinus latusinus* (Hilgendorf 1889)	ptr.; per.	—	—	—	—	—	—	—	—	r	—	—	—	—	—
22. *L. patella patella* (O.F.M. 1786)	cosm.; per.	—	—	—	—	—	—	—	—	—	—	—	r	—	—
23. *L. patella* (O.F.M.) n.f.	end.?; n.	—	—	—	—	—	—	—	—	—	—	—	r	—	—
24. *L. rhomboides* (s.l.) (Gosse 1886)	cosm.; per.	—	—	—	—	—	—	—	—	—	—	—	r	—	—
Fam. Lecanidae															
25. *Lecane bulla bulla* (Gosse 1851)	cosm.; per.	—	—	—	—	—	—	—	—	f	—	—	r	—	—
26. *L. closterocerca closterocerca* (Schmarda 1895)	cosm.; per.	—	—	—	—	—	—	—	—	—	—	—	r	—	—
27. *L. curvicornis curvicornis* (Murray 1913)	ptr.; per.	—	—	—	—	—	—	—	—	—	r	r	f	—	—
28. *L. hamata hamata* (Stokes 1896)	cosm.; per.	—	—	—	—	—	—	—	r	r	—	—	r	—	—
29. *L. doryssa* (Harring 1914)	ptr.; per.	—	—	—	—	—	—	—	—	—	—	—	r	—	—
30. *L. ludwigi* (s.l.) (Eckstein 1893)	cosm.; per.	—	—	—	—	—	—	—	—	r	—	—	r	—	—
31. *L. papuana* (Murray 1913)	ptr.; per.	—	—	—	—	—	—	—	—	r	—	—	r	—	—
32. *L. pyriformis* (Daday 1905)	cosm.; per.	—	—	—	—	—	—	—	—	—	—	—	r	—	—
33. *L. quadridentata* (Ehrb. 1832)	cosm.; per.	—	—	—	—	—	—	—	—	—	—	—	r	—	—
34. *L. scutata* (Harring & Myers 1926)	cosm.; per.	—	—	—	—	—	—	—	—	r	—	—	r	—	—
35. *L. signifera signifera* (Jennings 1896)	ptr.; per.	—	—	—	—	—	—	—	—	r	—	r	r	—	—
36. *L. signifera ploenensis* (Voigt 1902)	cosm.; per.	—	—	—	—	—	—	—	—	—	—	r	r	—	—
37. *L. tenuiseta* Harring 1914	cosm.; per.	—	—	—	—	—	—	—	—	—	—	—	r	—	—
38. *L. inopinata* (Harring & Myers 1926)	ptr.; per.	—	—	—	—	—	—	—	—	—	—	r	r	—	—
Fam. Euchlanidae															

Taxon		Sample number 1a	1b	2a	2b	3a	3b	4a	4b	5a	6b	7a	7b	8a	8b
39. *Dipleuchlanis propatula macrodactyla* (Hauer 1965)	ptr.; per.	—	—	—	—	—	—	—	—	r	—	—	r	—	—
Fam. Trichotridae															
40. *Macrochaetus collinsi* (Gosse 1867)	ptr.; per.	—	—	—	—	—	—	—	—	r	—	—	r	—	—
41. *M. danneeli* n. sp.	end.?, l; n.	—	—	—	—	—	—	—	—	—	—	—	r	—	—
Fam. Notommatidae															
42. *Scaridium longicaudum* (O.F.M. 1786)	cosm.; per.	—	—	—	—	—	—	—	—	r	—	—	r	—	—
43. *Monommata grandis* Tessin 1890	cosm.; per.	—	—	—	—	—	—	—	—	—	—	—	r	—	—
44. *M.* indet. (diff. sp.?)		—	—	—	—	—	—	—	—	r	—	—	—	—	—
45. *Taphrocampa selenura* (Gosse 1887)	cosm.; per.	—	—	—	—	—	—	r	—	r	—	—	r	—	—
46. *Notommata copeus* Ehrb. 1834	cosm.; per.	—	—	—	—	—	—	—	—	—	—	r	—	—	—
47. *N.* indet. (diff. sp.?)		—	—	—	—	—	—	—	—	r	—	r	r	—	—
48. *Resticula melandocus* (Gosse 1887)	cosm.; n.	—	—	—	—	—	—	—	—	—	—	r	—	—	—
49. *Eosphora* cf. *thoides* Wulfert 1935	cosm. l; n.	—	—	—	—	—	—	—	—	—	—	—	r	—	—
50. *Cephalodella gibba gibba* (Ehrb. 1832)	cosm.; per.	—	—	—	—	—	—	—	—	r	r	—	—	—	—
51. *C. tinca* Wulfert 1937	cosm.; n.	—	—	—	—	—	—	—	—	—	r	—	—	—	—
52. *C.* indet. (diff. sp.?)															
Fam. Trichocercidae															
53. *Trichocerca chattoni* De Beauchamp 1907	ptr.; per.	—	—	—	—	—	—	—	—	f	—	—	—	r	—
54. *T. longiseta* (Schrank 1802)	cosm.; per.	—	—	—	—	—	—	—	—	—	—	—	r	—	—
55. *T. pusilla* (Lauterborn 1898)	cosm.; per.	—	—	—	—	—	—	r	—	—	r	r	r	—	—
56. *T. similis similis* (Wierzejski 1893)	cosm.; per.	—	—	—	—	—	—	—	—	m	r	m	m	—	—
57. *T. stylata* (Gosse 1851)	cosm.; per.	—	—	—	—	—	—	—	—	—	—	r	r	—	—
Fam. Gastropodidae															
58. *Ascomorpha saltans saltans* Bartsch 1870	cosm.; n.	—	—	—	—	—	—	—	—	—	—	f	f	—	—
Fam. Synchaetidae															
59. *Synchaeta* cf. *longipes* Gosse 1887	cosm.; per.	—	—	—	—	—	—	—	—	—	—	f	r	—	—
60. *Polyarthra* cf. *vulgaris* Carlin 1943	cosm.; per.	—	—	—	—	f	f	r	r	f	f	f	f	r	—
Fam. Asplanchnidae															
61. *Asplanchna sieboldi* (Leydig 1854)	cosm.; per.	—	—	r	—	—	—	—	—	r	—	r	r	—	r
Fam. Dicranophoridae															
62. *Dicranophorus claviger australiensis* Koste & Shiel 1980	end.; per.	—	—	—	—	—	—	—	—	—	r	r	r	—	—
63. *D. grandis* (Ehrb. 1832)	cosm.; n.	—	—	—	—	—	—	—	—	—	—	r	—	—	—
Order Gnesiotrocha															
Fam. Testudinellidae															
64. *Testudinella patina patina* (Hermann 1783)	cosm.; per.	—	—	—	—	—	—	—	—	r	—	r	r	—	—
65. *T. tridentata tridentata* Smirnov 1931	ptr.; per.	—	—	—	—	—	—	—	—	r	—	r	r	—	—
Fam. Flosculariidae															
66. *Lacinularia flosculosa* (O.F.M. 1758)	cosm.; per.	—	—	—	—	—	—	—	—	—	r	—	r	—	—
67. *Octotrocha speciosa* Thorpe 1893	ptr., l; n.	—	—	—	—	—	—	—	—	—	—	—	r	—	—
Fam. Conochilidae															
68. *Conochilus dossuarius* (Hudson 1895)	ptr.; per.	—	—	—	—	—	—	—	—	f	—	f	f	r	r
69. *C. unicornis* Rousselet 1892	cosm.; n.	—	—	—	—	—	—	—	—	—	—	r	r	—	—
Fam. Hexarthridae															
70. *Hexarthra intermedia* Wiszniewski 1929	cosm.; per.	—	—	—	—	—	—	—	—	—	—	r	f	—	—
71. *H. mira* (Hudson 1871)	cosm.; per.	—	—	—	—	—	—	—	—	—	—	—	—	—	r
Fam. Filiniidae															
72. *Filinia australiensis* Koste 1980	end.; per.	—	—	—	—	—	—	—	f	—	—	—	—	—	—
73. *F. longiseta limnetica* (Zacharias 1893)	cosm.; n.	—	—	—	—	—	—	—	r	—	—	—	—	—	—
74. *F. opoliensis* (Zacharias 1898)	ptr.; per.	—	—	—	—	—	—	r	m	f	f	—	—	—	r
75. *F. passa* (O.F.M. 1786)	cosm.; n.	—	—	—	—	—	—	—	—	—	f	—	—	—	—
76. *F. pejleri* Hutchinson 1964	ptr.; per.	—	—	—	—	—	—	—	—	r	—	—	—	—	—
	Total species	1	1	3	0	4	2	9	11	33	16	29	56	3	5

Australia. These six, with four new species and 25 new records listed by Koste (1981), bring the Rotifera recorded from the continent to 477 (Koste 1978, 1979, 1980, 1981; Shiel & Koste 1979; Koste & Shiel 1980a,b; Green 1981).

Systematic descriptions

Brachionus falcatus Zacharias 1898 f. *reductus* n.f.

FIGS 2a,b; 3e

Material: More than 100 contracted females, some with subitaneous eggs; single population of uniform lorica form, sample 80120406. Type locality: Winmurra billabong on the eastern margin of the Magela Creek Valley, N.T. (Fig. 1), 132°53′20″, 12°31′41″S.

Holotype: Loricate female coll. R. D. Tait 8.12.1980, in type collection Zoological Museum, Christian Albrechts University, Kiel D–2300 FRG. Reg. no. 84.

Paratype: In W. Koste collection, *Brachionus*. Date and locality as holotype. See photomicrograph Fig. 2a-b.

Description: Very robust lorica of barrel-shaped outline. Anterior-, marginal- and medial spines as in type form. Submedial spines shortened in proportion to lorica. Caudal spines shortened but strongly developed. Surface of dorsal lorica (Fig. 2a) with pearl-like structures. Pair of ridges begin at basis of submedian spines, run to height of lateral antennae. Ventral lorica (Fig. 2b) flat and strong, detailed with a granulated pattern. Male not recorded.

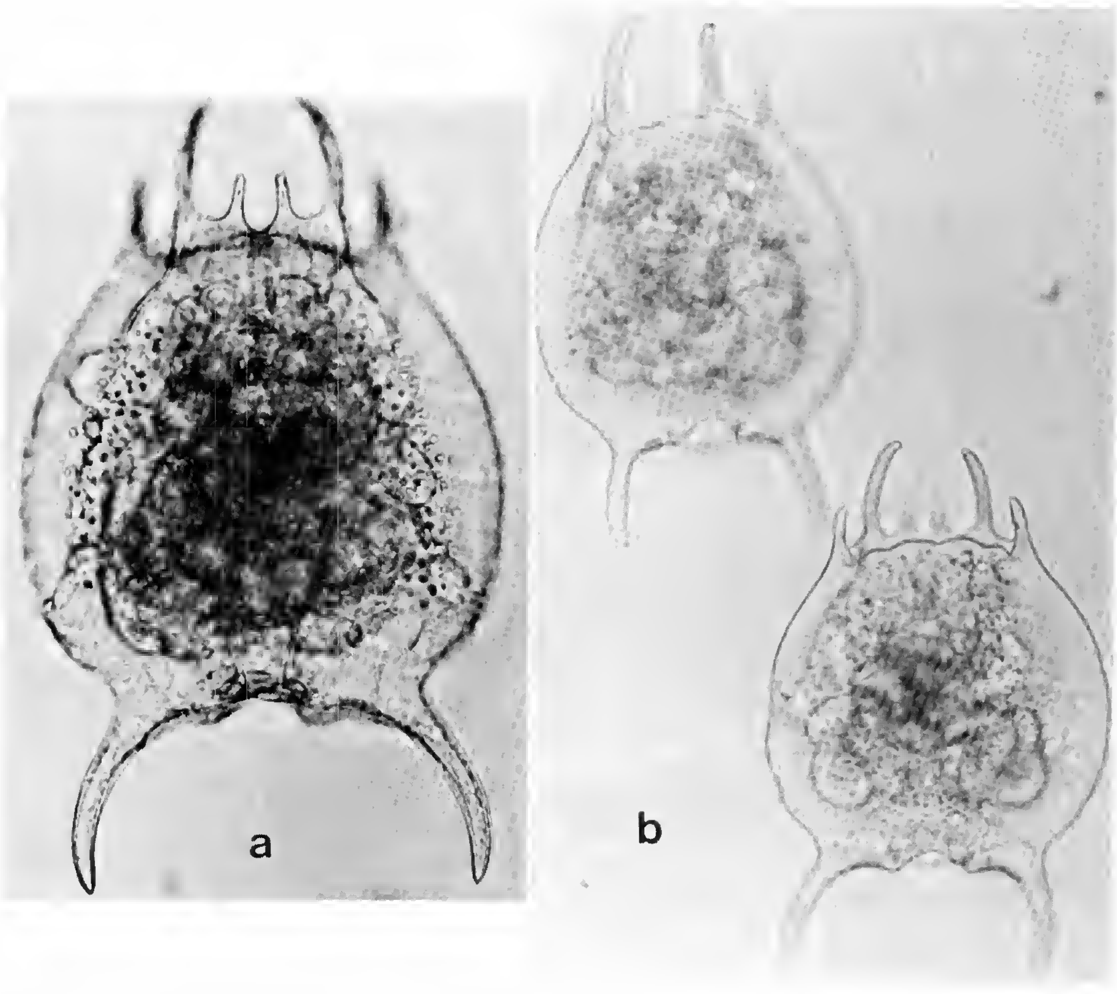

Fig. 2. a. *Brachionus falcatus* Zach. f. *reductus* showing large granules on the dorsal lorica. b. *B. falcatus* f. *reductus*, lorica, ventral view.

Measurements: Lorica length 100–280 μm, including anterior and posterior spines; lorica width 80–164 μm; subitaneous egg 80 × 60 μm to 100 × 72 μm.

Discussion: This pantropical and pansubtropical species (Ahlstrom 1940) shows little variability in its habit (Weber 1906, Chengalath *et al.* 1973, Pejler 1977, Koste 1978). It is occasionally encountered in summer warmed eutrophic biotopes in Europe, particularly in Romania and the Caucasus. In Australia, *B. falcatus* f. typ. was reported from Queensland by Colledge (1909). Koste & Shiel (1980), after a study of rotifer taxocenes in southern Australia, determined positive regional types with regard to lorica surface morphology (see also Figs. 3a-f).

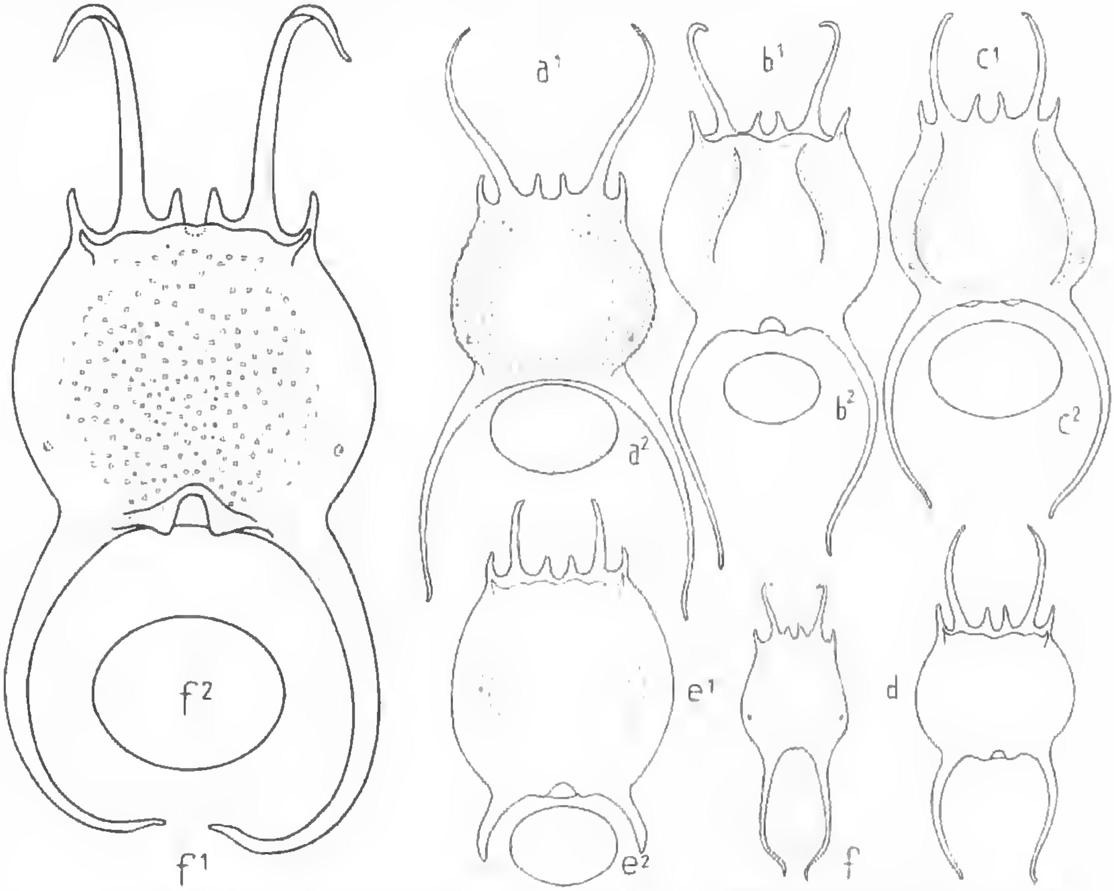

Fig. 3. *Brachionus falcatus* Zacharias 1898: various lorica forms. a^1–c^1: from Ja Ja billabong, lorica length 330–400 μm. a^2: subitaneous egg 100 × 70 μm; b^2: male egg 72 × 52 μm; c^2: subitaneous egg 100 × 72 μm; d: from Buffalo billabong, lorica length 260 μm, juvenile form; e^1: f. *reductus* n.f. from Winmurra billabong, lorica length 280 μm, lorica width 164 μm; e^2: subitaneous egg 80 × 60 μm; f: slender form from Malacca, S.E. Asia. Lorica length 335 μm, lorica width 160 μm. f^1: large form from River Murray, S. Aust. Lorica length 492 μm, lorica width 280 μm. f^2: subitaneous egg, 108 × 90 μm.

In populations studied earlier, juveniles occasionally were observed with shortened caudal spines (Fig. 3d). This apparently is due to allometric growth. Adult animals encountered in billabongs of the Magela Creek, however, mostly had curved postero-lateral spines exceeding body length. Only in Winmurra billabong was there a sparse population of individuals with uniformly robust, strongly shortened posterior spines. This morph is previously unknown. (Ahlstrom 1940: Fig. 10: 1–2; Voigt 1957: Fig. 21:10a–11; Sudzuki 1964: Fig. 9:1–7; Chengalath *et al.* 1973, Figs 24–26; Koste 1978: Fig. 14.2).

The reason for the reduction in terminal spines could not be established. Low oxygen levels in the biotope are noteworthy (3.72 mg O_2 1–1).

Brachionus urceolaris sericus (Rousselet 1907) n.f.

FIGS 4–6

Material: Two samples (80120803, 80111003) of 25 ml from the same locality with many females, all age classes with uniform loricas, many subitaneous eggs, large population.

Type locality: Mine Valley Billabong, Magela Creek near Jabiluka, N.T. 132°53′06″E/ 12°29′54″S (Fig. 1). Extreme biotope. Figs 4a, b.

Holotype: Lorica, single adult female from sample 80120803 coll. R. D. Tait 8.12.1980. Trophi preparation deposited in type collection, Zoological Museum, Christian Albrechts University, Kiel, D–2300 F.R.G., Reg. no. 85.

Paratype: Data as for holotype, Reg. no. 86.

Description: Lorica of heraldic outline without lateral posterior spines and with short anterior spines, median of which is a little longer. Dorsal lorica short, ventral lorica caudally tapering. Foot opening without protruding tube, ventral arch egg shaped, caudal trapezoid. Ventral anterior lorica margin plain, upper dorsal lorica with two stout ribs beginning between median and submedian spines and running in direction of periphery. Submedian spines reinforced with short cuticular outer borders. Lorica surface and foot opening reinforced dorsally, weaker ventrally and covered with granular structures. In lateral view, caudal lorica margin occasionally appears two-stage, elevated by sharp edge from narrow platelike base of foot tube opening. In dorsal view, two convex lines appear over foot tube, define boundary beneath dorsal lorica.

Measurements: Lorica length 120–220 μm, lorica width 80–172 μm. Foot opening ventral 52 μm high × 40 μm wide, dorsal 12 μm high × 15 μm wide.

Discussion: The lorica outline of the new *B. urceolaris sericus* form, with an elevated caudal section, resembles that of *B. quadridentatus* forms from the literature. In particular, *B. quadridentatus* var. *ancylognathus* (Schmarda 1859) and *B. quadridentatus* var. *cluniorbicularis* Skorikow 1884. The lorica surface of this distinctive polymorph, as in the *quadridentatus* species group, is granulated and dimpled, with tiny ridges present. Nevertheless, *urceolaris* and *quadridentatus* taxa are

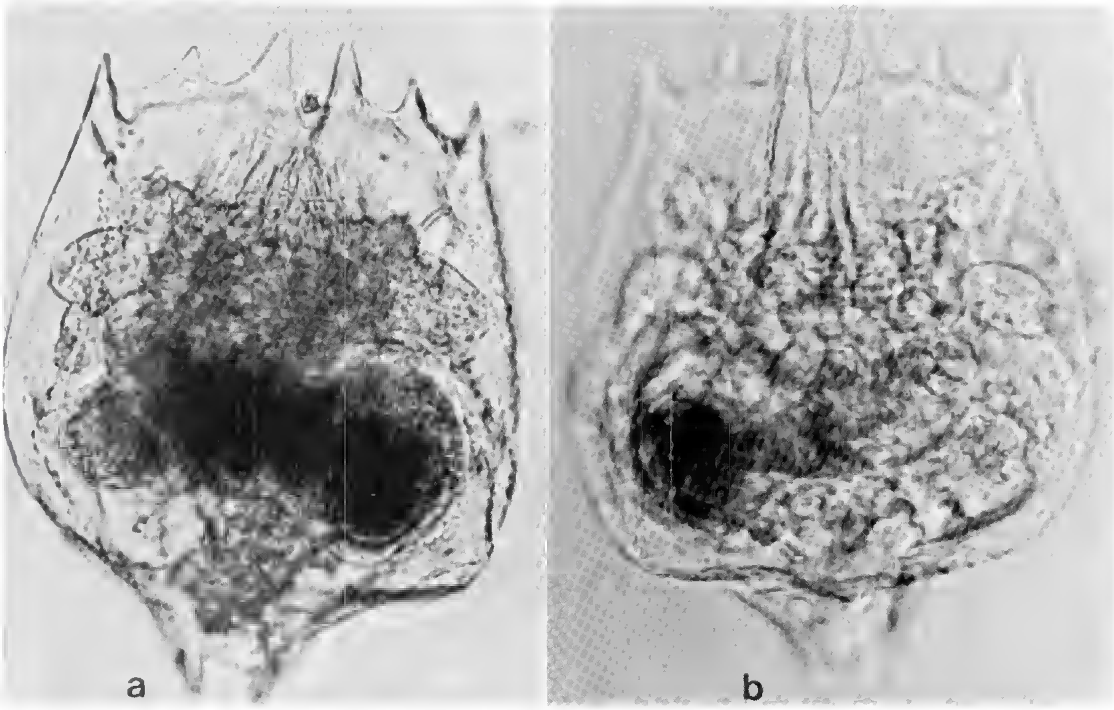

Fig. 4 *Brachionus urceolaris sericus* (Rousselet 1907) n.f. a: lorica, dorsal; b: lorica, ventral.

readily distinguished; the latter always has a projecting foot tube, whereas the former (Figs 5–6) has only a flat foot opening incised at the end of the ventral plate. Therefore, this taxon from northern Australia is considered a *Brachionus urceolaris* form of the subspecies *sericus* (Fig. 6a) after Hauer (1963) from *B. urceolaris* f. *sericus* (Rousselet 1907). This was previously described, however, with a more or less strongly pleated lorica surface, as in the type. See also Sladecek (1955) and Koste (1968). Hauer (1963) records morphs from Egypt, Sweden and Germany. We concluded that these forms of the species *B. urceolaris* (O.F. Muller 1776) (Fig. 6b) are produced in response to the chemistry of the respective habitats. A lorica surface as present in the new form of *B. urceolaris sericus* has not been described previously. It is characterized through a densely granulated and dimpled, striated surface, particularly pronounced in the caudal section of the lorica (Fig. 4a,b). Similar lorica patterns are seen on animals from small standing waters of the Sahara (Fig. 5a,b).

As for previous records of *B. urceolaris sericus*, the new form occurs in strongly acidified biotopes (pH 3.25–3.45), with greatly compacted and uniform loricas. Whereas *B. urceolaris urceolaris* (O.F.M.) is observed only in habitats with pH ranges of approximately 5.0–11.0, the ssp. *sericus* by comparison, is adapted to extreme biotopes, e.g. sulphate lakes, which are more strongly acidified (pH 2.8–4.0). It is commonly the only rotifer species in these habitats, apart from isolated incursion species of other taxa, to develop and maintain large populations. Both the type and ssp. are cosmopolitan.

Machrochaetus danneeli n.sp.

FIGS 7, 9

Material: Two contracted females from sample 8011107.

Type locality: Buffalo billabong, Magela Creek valley, 132°52′40″E; 12°34′55″, south of Jabiluka, N.T. (Fig. 1).

Holotype: Female with contracted head (Fig. 7a-b); trophi preparation in glycerine with Caedex inclusion, deposited in type collection Zoological Museum, Christian Albrechts University, Kiel, FRG. Reg. no. 87.

Paratype: Lost in preparation. See Iconoparatype Fig. 7.

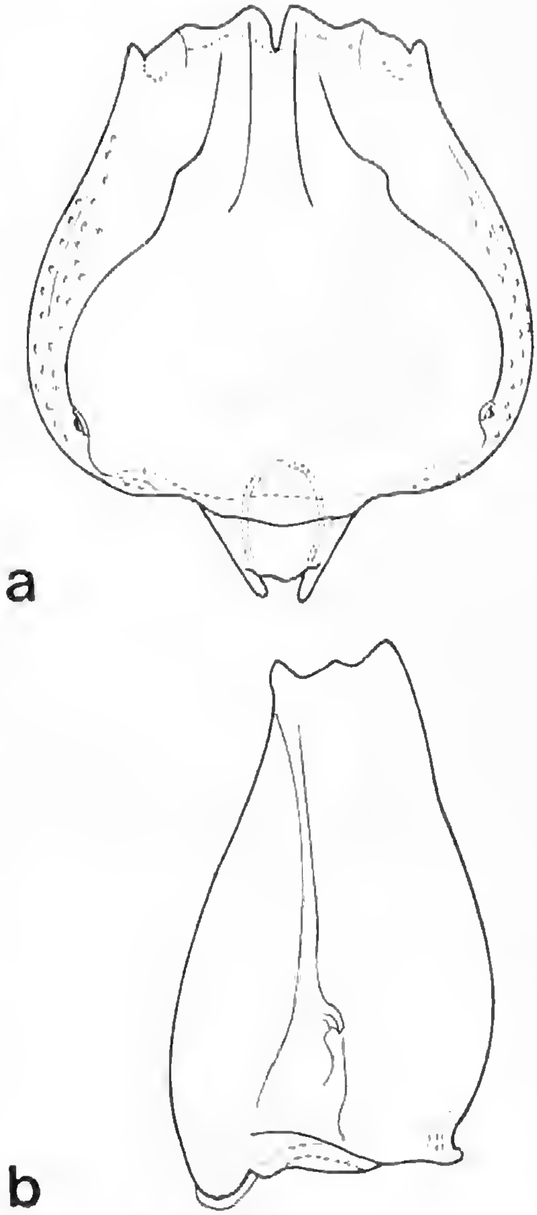

Fig. 5. *Brachionus urceolaris sericus* f. *africana*. a: lorica, dorsal; b: lorica lateral.

Description: Lorica covered with pustules and granules. Body with usual cross section (Fig. 9b), egg with elliptical outline. Anal segment spineless. Dorsal lorica with terraced sides to blunt keel. Margin of keel base with longer spinules, terraced rim wider at start, tapering caudally; uppermost keel dorsum covered with large cuticular ledges and beading. Shoulder spines, posterolateral-, postermedian- and only one pair of rudimentary anterosubmedian

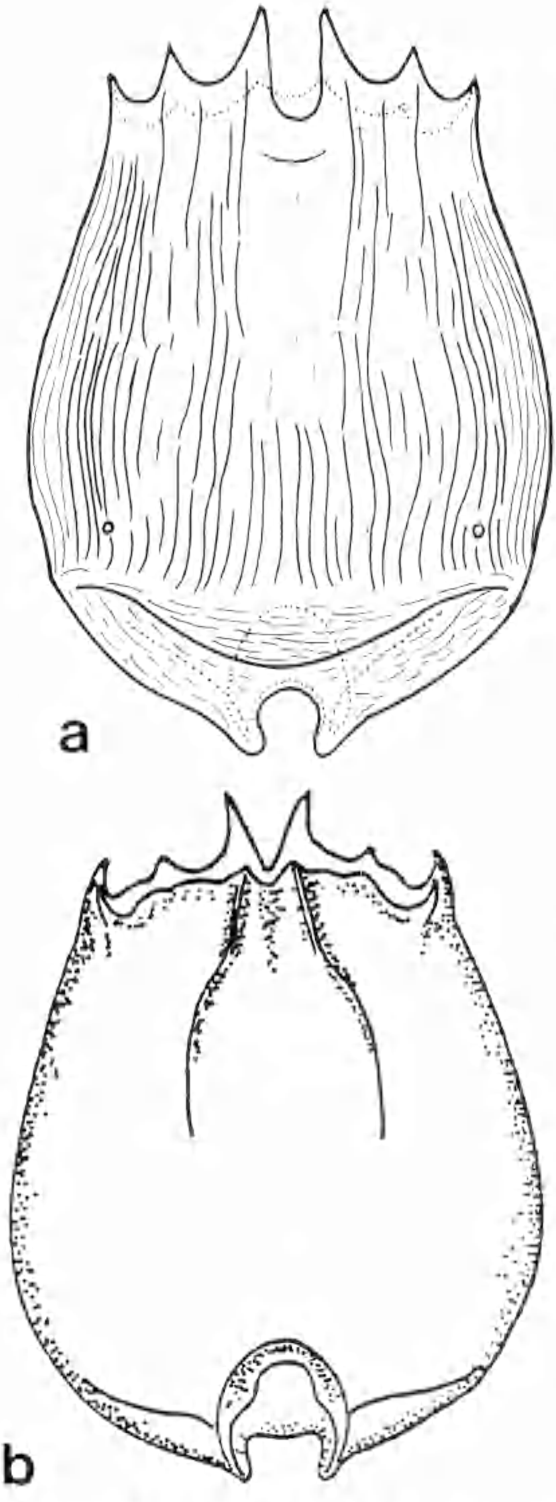

Fig. 6. a: *Brachionus urceolaris sericus* (Rousselet 1907), b: f. typica from N.W. Germany.

spines present (3a-b, Fig. 9a). Lateral antennae project from strong three stepped cylindrical pyramid. Ventral lorica with blunt keel and shallow curved, wide foot opening. Foot bi-articulated; toes short, spindle-formed. *Measurements:* Lorica length 125–130 μm, lorica width 130–137 μm. Foot segment 20 μm, toe length 16–18 μm.

Discussion: The important taxonomic morphological characteristic of *Macrochaetus* Perty is the number of spines and longer spinules (see Wulfert 1964 and Koste 1978). Their total number (Fig. 9a) ranges from 8 (without shoulder spines, Fig. 8a-b, cf. Fig. 8, *M. sericus* (Thorpe 1893)) to 16 (cf. for example Fig. 10, *M. multispinosus* Myers 1934). Of the possible insertion points of the dorsal spines in the taxon described here, only 2a-b and 6a-b are occupied. Shoulder hooks and short posteroventral spines are present. The deeply extended spine-free anal segment (Fig. 7b) is, moreover, noteworthy. A *Macrochaetus* with this morphological characteristic is hitherto unknown.

Etymology: This new species is dedicated to Prof. Dr Ilse Danneel, University of Duisburg.

General ecological features

As shown in Table 3, only 76 taxa were recorded from the 13 Nov.-Dec. samples, whereas 174 were identified from samples collected in April (cf. Koste 1981). Of the 76 recorded taxa, 40 are cosmopolitan, 15 pantropical or pansubtropical, seven probably endemic, 53 perennial. There were 16 new records for the biotope, four new records for Australia, and 12 indeterminate taxa.

Table 3 shows also that the deep billabongs of the Mudginberri corridor (Buffalo, Island) supported a species rich rotifer taxocene in spite of the onset of the dry, with increased conductivity and acidity. The floodplain billabongs (Nankeen, Mine Valley, Leichhardt) had a depauperate fauna or were free of rotifers (Jabiluka). Some of the latter biotopes, as a result of strongly acid conditions (Mine Valley pH 3.25–3.45, Ja-Ja pH 4.08–4.24, Jabiluka pH 4.14–4.77), can be considered extreme biotopes. In addition to incursion species with low abundance, very dense populations of fugitive species developed in some of these, e.g. *B. urceolaris sericus* in Mine Valley. Overall, mass populations (over 20% of the respective species present) were recorded for the following taxa: *Brachionus angularis* (Winmurra), *B. budapestinensis*

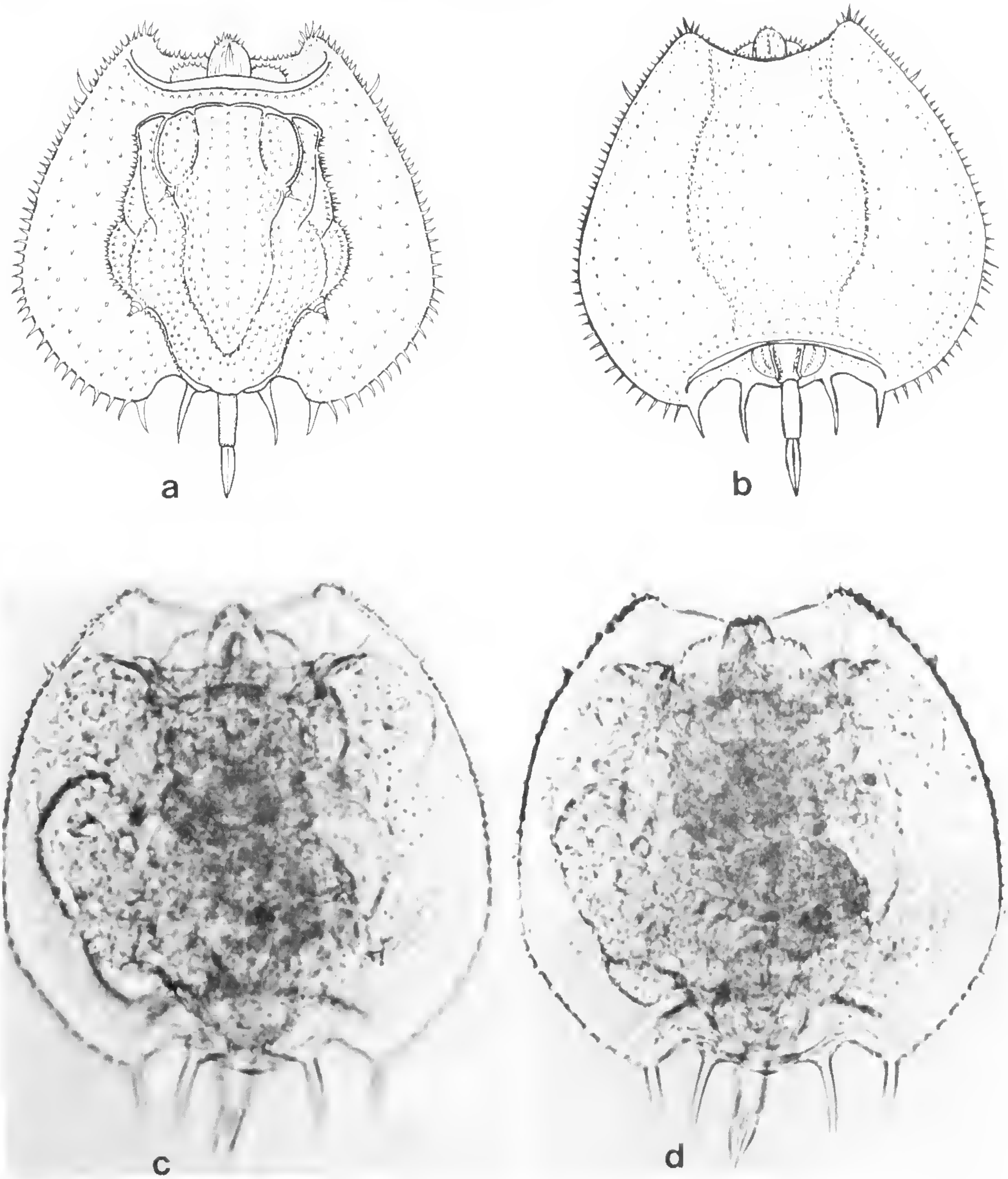

Fig. 7. a: *Macrochaetus danneeli* n. sp., contracted female. Lorica length 130 μm, lorica width 136 μm. b: *M. danneeli* n. sp., contracted female, ventral. c: *M. danneeli*, n. sp., dorsal. d: *M. danneeli*, n. sp., ventral (cf. Fig. 7c).

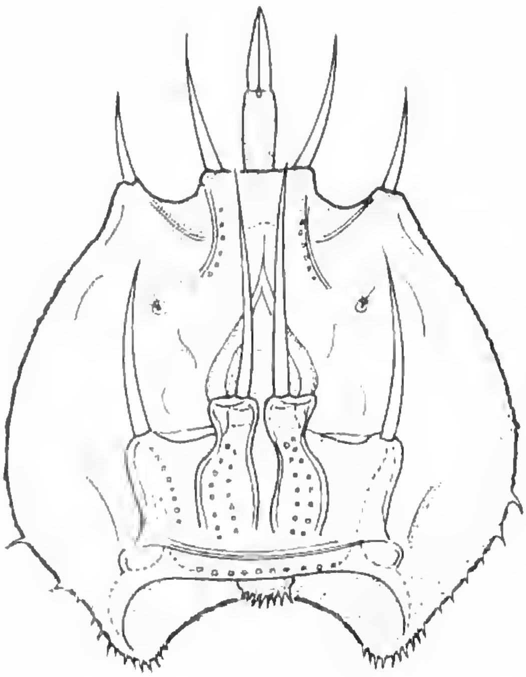

Fig. 8. *Macrochaetus sericus* (Thorpe 1893) dorsal.

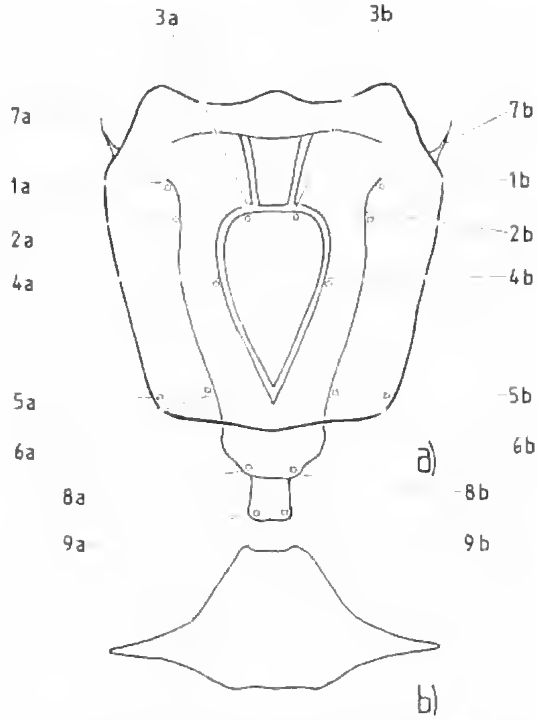

Fig. 9. a. Points of insertion of spines and setules in the genus *Macrochaetus* Perty 1850. 1a–b Anterolateral spines; 2a–b Anterosubmedian spines; 3a–b Anteromedian spines; 4a–b central dorsal spine pair; 5a–b Posterolateral spines; 6a–b Posteromedian spines; 7a–b shoulder hooks; 8a–b Anal segment spines. b. Lorica transverse section of a *Macrochaetus*.

(Winmurra), *B. falcatus* (Buffalo), *Epiphanes clavulata* (Leichhardt), *Filinia opoliensis* (Ja Ja), *Keratella tropica* (Ja Ja, Jabiluka, Island) and *Trichocerca similis* (Island, Buffalo). These observations are in accord with those on billabong plankton populations in south eastern Australia, where different species dominants occur even in adjacent billabongs, often in bloom proportions, in both rotiferan and microcrustacean components of the plankton (Shiel 1980, 1981[4]).

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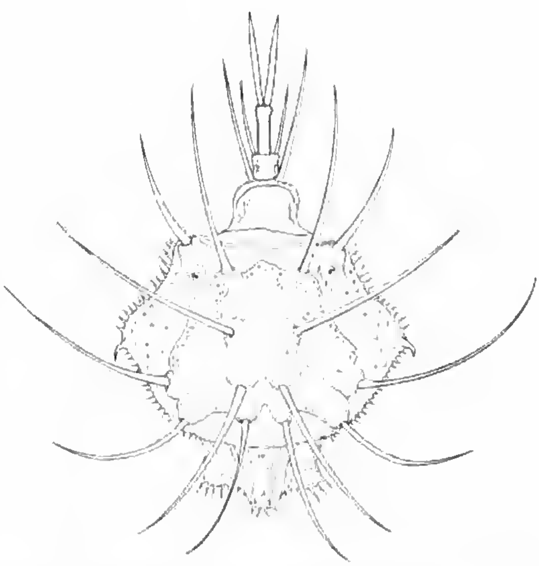

Fig. 10. *Macrochaetus multispinosus* Myers 1934, dorsal (from S. America).

TABLE 3. *Comparison of species present in samples from each billabong at the end of wet and end of dry seasons.*

Billabong	End of wet season		End of dry season	
Nankeen	15.06.79	15.04.80	10.11.80	08.12.80
01	29	28	1	1
Jabiluka	13.06.79	15.04.80	10.11.80	08.12.80
02	24	36	3	0
Mine Valley	13.06.79	15.04.80	10.11.80	08.12.80
03	67	36	4	2
Ja Ja	13.06.79	15.04.80	10.11.80	08.12.80
04	35	28	9	11
Island	14.06.79	15.04.80	10.11.80	08.12.80
05	21	40	33	n.a.
Winmurra	14.06.79	15.04.80	10.11.80	08.12.80
06	36	61	n.a.	16
Buffalo	14.06.79	15.04.80	11.11.80	08.12.80
07	26	41	29	56
Leichhardt	13.06.79	15.04.80	11.11.80	08.12.80
08	19	55	3	5

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